

MONTHLY NOTICES

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No. 1

Major P. A. MacMahon, D.Sc., Sc.D., LL.D., F.R.S., President,
in the Chair.

The Rev. F. C. Lees, M.A., F.R.G.S., 45 Cavendish Road,
Sutton, Surrey ;
Hector Munro Macdonald, M.A., F.R.S., Professor of Mathematics,
University, Aberdeen ;
William John Roberts, Tullyroan, Co. Armagh ; and
Captain the Hon. Victor A. Spencer, 50A Curzon Street,
London, W. 1,
were balloted for and duly elected Fellows of the Society.

The following candidates were proposed for election as Fellows
of the Society, the names of the proposers from personal knowledge
being appended :—

William Henry Allen, Bromham House, near Bedford, Vice-President
of the Institution of Mechanical Engineers
(proposed by W. H. Maw) ;
John Edensor Littlewood, F.R.S., Fellow and Lecturer, Trinity
College, Cambridge (proposed by A. S. Eddington) ;
William Evan M'Farlane, M.B., C.H.B., F.R.G.S., Surveyor to
Walsh District Hospital, Medical Officer of Health, Irvine-
bank, North Queensland, Australia (proposed by Ernest
H. Beattie) ;
Lieut.-Commander Edvin Smith, M.A., R.N.V.R., Tillsenburg,
Ontario, Canada (proposed by O. T. Olsen) ;

I

2 Prof. A. S. Eddington, *Pulsations of a Gaseous Star* LXXIX. I,

H. H. Waters, 16 York Avenue, Great Crosby, Liverpool (proposed by F. W. Longbottom); and
 Major A. J. Wolff, D.S.O., R.E., Ordnance Survey Office, Southampton (proposed by Sir C. F. Close).

One hundred and nine presents were announced as having been received since the last Meeting, including, amongst others:—

H. Andoyer, *Formules et Tables nouvelles relatives à l'étude du mouvement des Comètes (etc.)*; G. Bigourdan, *Observations des Nébuleuses et d'Amas Stellaires* (5 volumes); L. Silberstein, *Elements of the Electromagnetic Theory of Light*; presented by the authors.

H. C. Plummer, *Introductory Treatise on Dynamical Astronomy*, presented by the Cambridge University Press.

Set of the Proceedings of the London Mathematical Society, first and second series, presented by the Society.

On the Pulsations of a Gaseous Star and the Problem of the Cepheid Variables. Part I. By A. S. Eddington, M.A., F.R.S., Plumian Professor.

1. Although variable stars of the Cepheid type show a periodic change of radial velocity, it is improbable that they are binary stars. The theory which now appears most plausible attributes the light-changes to the pulsation of a single star;* and accordingly the varying radial velocity measures the approach and recession of the surface in the course of the pulsation. In order to throw light, if possible, on the phenomena of these variables, I have investigated the theory of a pulsating mass of gas. A complete solution of this problem would be very difficult; but it seems to be possible to determine the general character of the oscillation, and to obtain results which may be compared with observation.

The type of pulsation here considered is symmetrical about the centre; that is to say, the star remains spherical, but expands and contracts. It is possible that the actual oscillation may be an elliptical deformation; but I think that a symmetrical oscillation is more probable in a star of low density, and it is much simpler to investigate.

It may be useful to summarise some of the leading results of observation with regard to these variables—

- (i) The light-curve and the velocity-curve are closely similar. The correspondence is the more marked because both curves are usually very unsymmetrical. Maximum light corresponds to maximum velocity of approach.

* H. Shapley, *Ap. J.*, 40, 448. H. C. Plummer, *Monthly Notices*, 75, 573.